

APPROVED BY
BUREAU OF EXPLOSIVES

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LOADING AND BRACING[●] IN MILVAN CONTAINERS[⊕] OF MK20 AND MODS (ROCKEYE II) AND CBU-78/B (GATOR) PACKED IN THE MK18 MOD 0 CRADLE

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● LOADING AND BRACING SPECIFICATIONS SET FORTH WITHIN THIS DRAWING ARE APPLICABLE TO LOADS THAT ARE TO BE SHIPPED BY TRAILER/CONTAINER-ON-FLATCAR (T/COFC) RAIL CARRIER SERVICE. THESE SPECIFICATIONS MAY ALSO BE USED FOR LOADS THAT ARE TO BE MOVED BY MOTOR OR WATER CARRIERS.

⊕ ONLY MILVAN CONTAINERS WHICH HAVE BEEN MODIFIED TO INCLUDE A MECHANICAL LOAD-BRACING SYSTEM THAT SATISFIES THE REQUIREMENTS OF THE BUREAU OF EXPLOSIVES PAMPHLET 6C WILL BE USED FOR THE MOVEMENT OF AMMUNITION BY T/COFC SERVICE. CAUTION: OTHER REQUIREMENTS OF PAMPHLET 6C ALSO APPLY.

U.S. ARMY MATERIEL COMMAND DRAWING

APPROVED, U.S. ARMY ARMAMENT, MUNITIONS AND
CHEMICAL COMMAND

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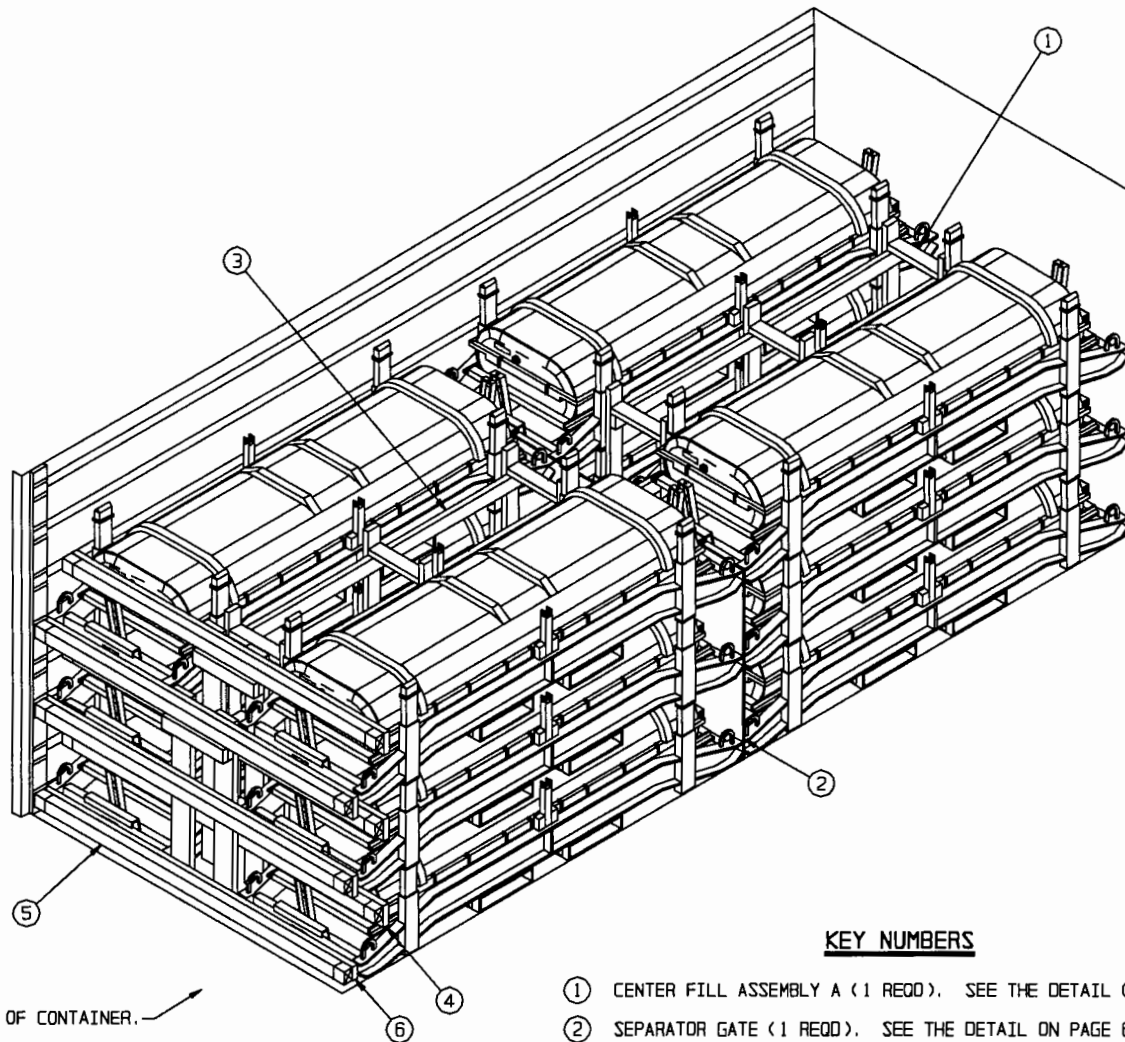
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CLASS	DIVISION	DRAWING	FILE
19	48	8543	SP15J39

DO NOT SCALE

PROJECT SP 245-92



REAR OF CONTAINER. →

ISOMETRIC VIEW

KEY NUMBERS

- ① CENTER FILL ASSEMBLY A (1 REQD). SEE THE DETAIL ON PAGE 5.
- ② SEPARATOR GATE (1 REQD). SEE THE DETAIL ON PAGE 6.
- ③ CENTER FILL ASSEMBLY B (1 REQD). SEE THE DETAIL ON PAGE 5.
- ④ LOAD BEARING GATE A (1 REQD). SEE THE DETAIL ON PAGE 6.
- ⑤ CROSS MEMBER (6 REQD). POSITION AS SHOWN IN THE DETAIL ABOVE, AT THE 5", 16", 28", 38", 48" AND 60" HEIGHTS. SEE THE "FILL DETAIL" ON PAGE 4.
- ⑥ LOAD BEARING GATE B (1 REQD). SEE THE DETAIL ON PAGE 7.

BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	204	136
2" X 6"	56	56
NAILS	NO. REQD	POUNDS
10d (3")	204	3-1/4
PLYWOOD, 1/2"	30.33 SQ FT REQD	41.71 LBS
CROSS MEMBER		6 REQD

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
MK1B CRADLE	12	17,460 LBS
DUNNAGE		429 LBS
CONTAINER		5,700 LBS
TOTAL WEIGHT		23,589 LBS (APPROX)

- H. PORTIONS OF THE CONTAINER DEPICTED WITHIN THIS DRAWING, SUCH AS ONE OF THE SIDEWALLS, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.
- J. CONVERSION TO METRIC EQUIVALENTS: DIMENSIONS WITHIN THIS DOCUMENT ARE EXPRESSED IN INCHES, AND WEIGHTS ARE EXPRESSED IN POUNDS. WHEN NECESSARY, THE METRIC EQUIVALENTS MAY BE COMPUTED ON THE BASIS OF ONE INCH EQUALS 25.4MM AND ONE POUND EQUALS 0.454 KG.
- K. MAXIMUM LOAD WEIGHT CRITERIA:

THE ITEMIZED LOAD WEIGHTS ARE CONTROLLED BY EQUIPMENT CAPABILITY FACTORS. ALSO, THESE LISTED LOAD WEIGHTS IDENTIFY THE COMBINED WEIGHT OF AMMUNITION LADING UNITS AND DUNNAGE THAT CAN BE PLACED INTO ONE MILVAN CONTAINER WITHOUT VIOLATING ONE OR MORE OF THE "CAPABILITY FACTORS". SEE NOTES 1 AND 2.

- 39,100 LBS IN 20-FT CONTAINER (W/O CHASSIS) ABOARD CONTAINERSHIP.
- 39,100 LBS IN CONTAINER ON 20-FT CHASSIS WITH DOUBLE BOGIE. SEE NOTE 3.
- 25,300 LBS IN CONTAINER ON 20-FT CHASSIS WITH SINGLE BOGIE. SEE NOTE 4.
- 21,300 LBS IN EACH CONTAINER ON 40-FT CHASSIS (COUPLED WITH DOUBLE BOGIE). SEE NOTE 3.

NOTE 1: DUNNAGE INCLUDES MATERIALS, OTHER THAN COMPONENTS OF THE MECHANICAL LOAD BRACING SYSTEM, USED TO BLOCK AND BRACE A LOAD.

NOTE 2: ALTHOUGH THE HEAVIEST MAXIMUM LOADS ARE DELINEATED IN THE LOAD VIEWS, PROVISIONS ARE INCLUDED WITHIN THIS DRAWING SO THAT THE BASIC LOADS CAN BE ADJUSTED TO SATISFY A LESSER QUANTITY OF LADING UNITS.

NOTE 3: DEPENDING ON TRANSPORTATION ROUTING, IT MAY BE NECESSARY TO REDUCE THE LOAD WEIGHT TO SATISFY "WEIGHT LAWS" OF CERTAIN STATES. ALSO, IT MAY BE NECESSARY TO REDUCE THE LOAD WEIGHT TO SATISFY OTHER WEIGHT RESTRICTIONS IMPOSED ON THE MILVAN SYSTEM.

NOTE 4: BY SPECIAL AUTHORITY, IT MAY BE POSSIBLE TO MOVE HEAVIER LOADS ON SINGLE BOGIE CHASSIS WITHIN AN INSTALLATION.

L. SPECIAL T/COFC NOTES:

1. CAUTION: LOADED CONTAINERS MUST BE ON CHASSIS EQUIPPED WITH TWO BOGIE ASSEMBLIES WHEN BEING MOVED IN TOFC SERVICE, REGARDLESS OF THE LOAD WEIGHT WITHIN THE CONTAINER.
2. LOAD LIMITS OF T/COFC RAIL CARS MUST NOT BE EXCEEDED, NOR WILL A CAR BE LOADED SO THAT THE TRUCK UNDER ONE END OF THE CAR CARRIES MORE THAN ONE-HALF OF THE LOAD LIMIT FOR THAT CAR.
3. CHASSIS/CONTAINERS COUPLED INTO A 40-FOOT TRAILER CONFIGURATION MUST BE PLACED AT THE B-END OF A TOFC RAIL CAR. THE REAR END OF THE 40-FOOT UNIT WILL OVERHANG THE END OF THE CAR IF IT IS PLACED AT THE A-END. TWENTY-FOOT AND 40-FOOT UNITS CAN BE LOADED ON THE SAME CAR.

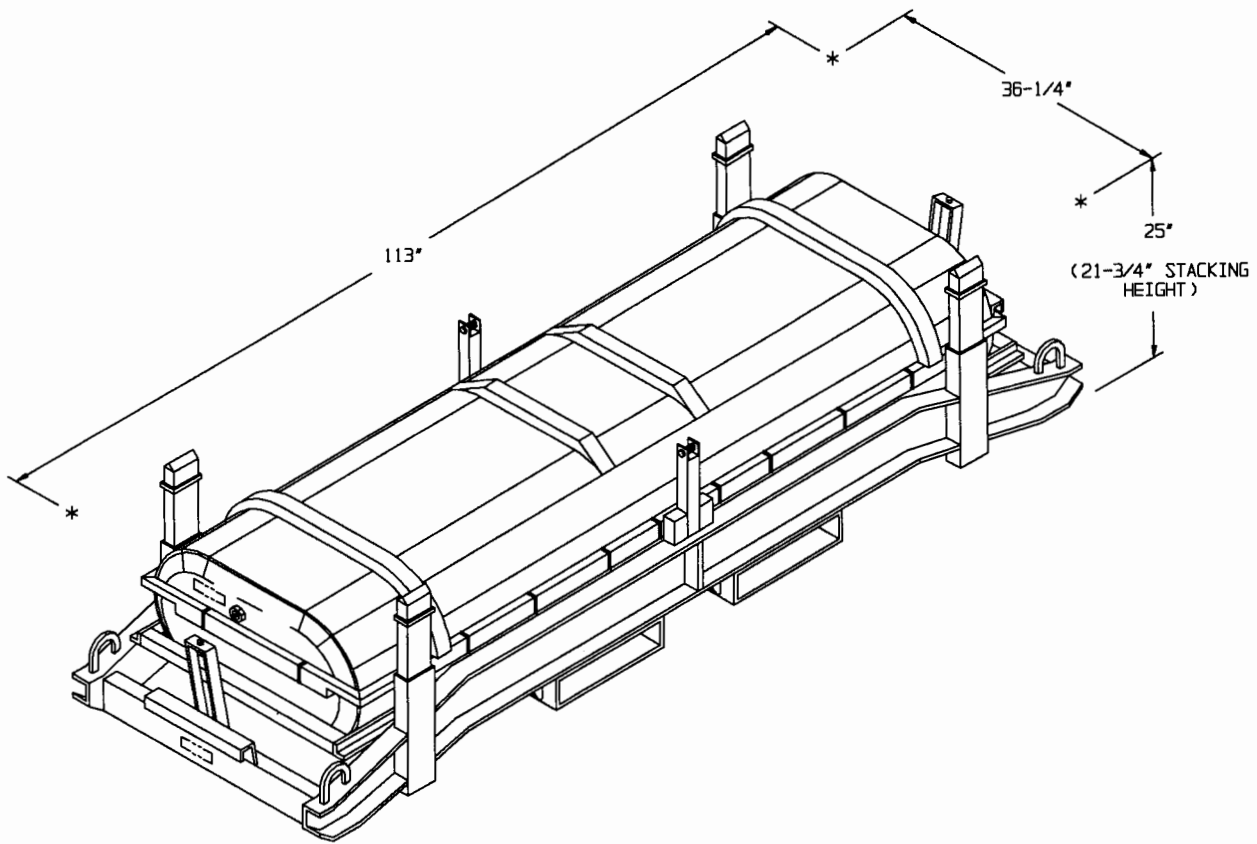
- M. WHEN LOADING CRAOLES, THEY ARE TO BE POSITIONED SO AS TO ACHIEVE A TIGHT LOAD Laterally and Longitudinally WITHIN THE MILVAN. ALTHOUGH A TOTAL OF 1-1/2" OF UNBLOCKED SPACE ACROSS THE WIDTH OF A LOAD BAY IS PERMITTED, LONGITUDINAL VOIDS WITHIN THE LOAD ARE TO BE KEPT TO A MINIMUM. ADJUSTMENTS CAN BE MADE BY LAMINATING ADDITIONAL PIECES OF APPROPRIATE THICKNESS TO THE VERTICAL PIECES ON THE LOAD BEARING GATES. NAIL EACH ADDITIONAL PIECE TO THE VERTICAL PIECE W/1 APPROPRIATELY SIZED NAIL EVERY 12". ADDITIONALLY, THE LENGTH OF THE STRUTS IN THE LOAD BEARING GATES MAY BE ADJUSTED, AS NECESSARY, TO FACILITATE VARIANCE IN THE CRADLE SIZE.
- N. THE QUANTITY OF CRADLES SHOWN IN THE LOAD ON PAGE 2 MAY BE REDUCED FOR SHIPMENT, IF DESIRED. SEE THE "LESS-THAN-FULL-LOAD" DETAILS ON PAGE B. WHEN A MILVAN IS TO BE LOADED WITH A REDUCED QUANTITY OF LADING UNITS, THE LENGTHWISE CENTER OF GRAVITY OF THE LOAD MUST BE WITHIN 12", IN EITHER DIRECTION, OF THE MID-POINT OF THE MILVAN.
- O. ANTI-CHAFING MATERIAL MAY BE INSTALLED AT POINTS OF CONTACT BETWEEN CRADLES AND THE MILVAN, AND BETWEEN CRADLES AND STEEL STRAPPING, IF DESIRED, TO PREVENT CHAFING DAMAGE TO CRADLE PAINT AND MARKINGS.

- A. THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AR 740-1 AND AUGMENTS TM 743-200-1 (CHAPTER 5).
- B. THE SPECIFIED OUTLOADING PROCEDURES ARE APPLICABLE TO LOADS OF MK20 AND MOOS (ROCKEYE II) AND CBU-78/B (GATOR) WHEN PACKED IN THE MK18 MOD 0 CRAOLE. SUBSEQUENT REFERENCE TO CRADLE HEREIN MEANS THE MK18 MOD 0 CRAOLE WITH CONTENTS. SEE PAGE 4 FOR DETAIL OF THE CRADLE. CAUTION: REGARDLESS OF THE QUANTITY OF CRADLES TO BE SHIPPED, THE "MAXIMUM GROSS WEIGHT" OF THE MILVAN MUST NOT BE EXCEEDED.
- C. THE LOADS AS SHOWN ARE BASED ON A 20' LONG BY B' WIDE BY B' HIGH MILVAN CONTAINER WITH INSIDE DIMENSIONS OF 19'-4" LONG BY 92" WIDE BY 87" HIGH. THE LOADS ARE DESIGNED FOR TRAILER/CONTAINER-ON-FLATCAR (T/COFC) SHIPMENT.
- D. THE SPECIFIED OUTLOADING PROCEDURES ARE FOR CONTAINERS EQUIPPED WITH SELF-CONTAINED MECHANICAL BRACING DEVICES AS DESCRIBED WITHIN BUREAU OF EXPLOSIVES PAMPHLET 6C. CROSS MEMBER ATTACHMENT FACILITIES WITHIN THESE CONTAINERS MUST PROVIDE FOR THE INSTALLATION OF LOAD BLOCKING CROSS MEMBERS AT THE HEIGHTS SPECIFIED. THE WEIGHT DIMENSIONS SPECIFIED WITHIN THIS DRAWING FOR THE INSTALLATION OF CROSS MEMBERS CONFORM WITH THE BUREAU OF EXPLOSIVES PAMPHLET 6C, WITH THE EXCEPTION THAT TWO ADDITIONAL BELT RAILS HAVE BEEN SHOWN: ONE AT 72" AND ONE AT 83" HIGH FROM THE CONTAINER FLOOR. VOIDS LENGTHWISE WITHIN THE LOAD MUST BE HELD TO A MINIMUM. CROSS MEMBERS MUST BE PLACED AGAINST THE LADING AS TIGHTLY AS THE HOLE SPACING IN THE CROSS MEMBER ATTACHMENT FACILITY PERMITS. EACH CROSS MEMBER WILL BE INSTALLED WITH THE ENDS ATTACHED AS NEARLY AS POSSIBLE IN "MATED" POSITIONS (AT EQUAL HEIGHT AND AT EQUAL DISTANCES FROM THE END OF THE CONTAINER). CROSS MEMBERS IN EMPTY CONTAINERS AND THOSE NOT USED IN LOADED CONTAINERS MUST BE FASTENED INTO BELT RAILS FOR SHIPMENT. COMPONENTS ASSIGNED TO EACH CONTAINER MUST REMAIN THEREWITH EVEN THOUGH UNUSED DURING SOME SHIPMENTS. SEE THE "FILL DETAIL" ON PAGE 4 FOR THE DUNNAGING METHOD REQUIRED TO ELIMINATE AN EXCESSIVE LENGTHWISE VOID WITHIN A LOAD. THE LOAD BLOCKING COMPONENT DESIGNATED AS "CROSS MEMBER" HEREIN, IS IDENTIFIED AS "BEAM ASSEMBLY" WITHIN TM 55-8115-200-23 & P, DATED DECEMBER 1979. THE BEAM ASSEMBLY IS FURTHER IDENTIFIED AS NSN 8115-00-165-6623.
- E. DUNNAGE LUMBER SPECIFIED IS OF A NOMINAL SIZE. FOR EXAMPLE, 1" X 4" MATERIAL IS ACTUALLY 3/4" THICK BY 3-1/2" WIDE AND 2" X 6" MATERIAL IS ACTUALLY 1-1/2" THICK BY 5-1/2" WIDE.
- F. CAUTION: DO NOT NAIL DUNNAGE MATERIAL TO THE CONTAINER WALLS OR FLOOR. ALL NAILING WILL BE WITHIN THE DUNNAGE.
- G. A STAGGERED NAILING PATTERN WILL BE USED WHENEVER POSSIBLE WHEN NAILS ARE DRIVEN INTO JOINTS OF DUNNAGE ASSEMBLIES OR WHEN LAMINATING DUNNAGE. ADDITIONALLY, THE NAILING PATTERN FOR AN UPPER PIECE OF LAMINATED DUNNAGE WILL BE ADJUSTED AS REQUIRED SO THAT A NAIL FOR THAT PIECE WILL NOT BE DRIVEN THROUGH ONTO OR RIGHT BESIDE A NAIL IN A LOWER PIECE.

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MATERIAL SPECIFICATIONS

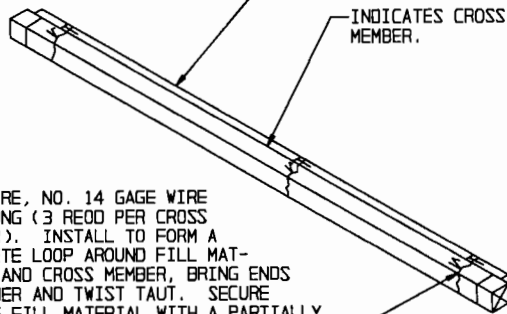
- LUMBER - - - - - : SEE TM 743-200-1 (DUNNAGE LUMBER) AND FED SPEC MM-L-751.
- NAILS - - - - - : FED SPEC FF-N-105; COMMON.
- PLYWOOD - - - - - : COMMERCIAL ITEM DESCRIPTION A-A-55057, TYPE A, CONSTRUCTION AND INDUSTRIAL PLYWOOD, INTERIOR WITH EXTERIOR GLUE, GRADE C-0. IF SPECIFIED GRADE IS NOT AVAILABLE, A BETTER INTERIOR OR AN EXTERIOR GRADE MAY BE SUBSTITUTED.
- STRAPPING, STEEL - - - : ASTM D3953; FLAT STRAPPING, TYPE 1, HEAVY DUTY, FINISH A, B (GRADE 2), OR C.
- SEAL, STRAP - - - - - : ASTM D3953; CLASS H, FINISH A, B (GRADE 2), OR C, DOUBLE NOTCH TYPE, STYLE I, II, OR IV.
- ANTI-CHAFING MATERIAL - - - - - : MIL-B-121 (OR EQUAL); NEUTRAL BARRIER MATERIAL.



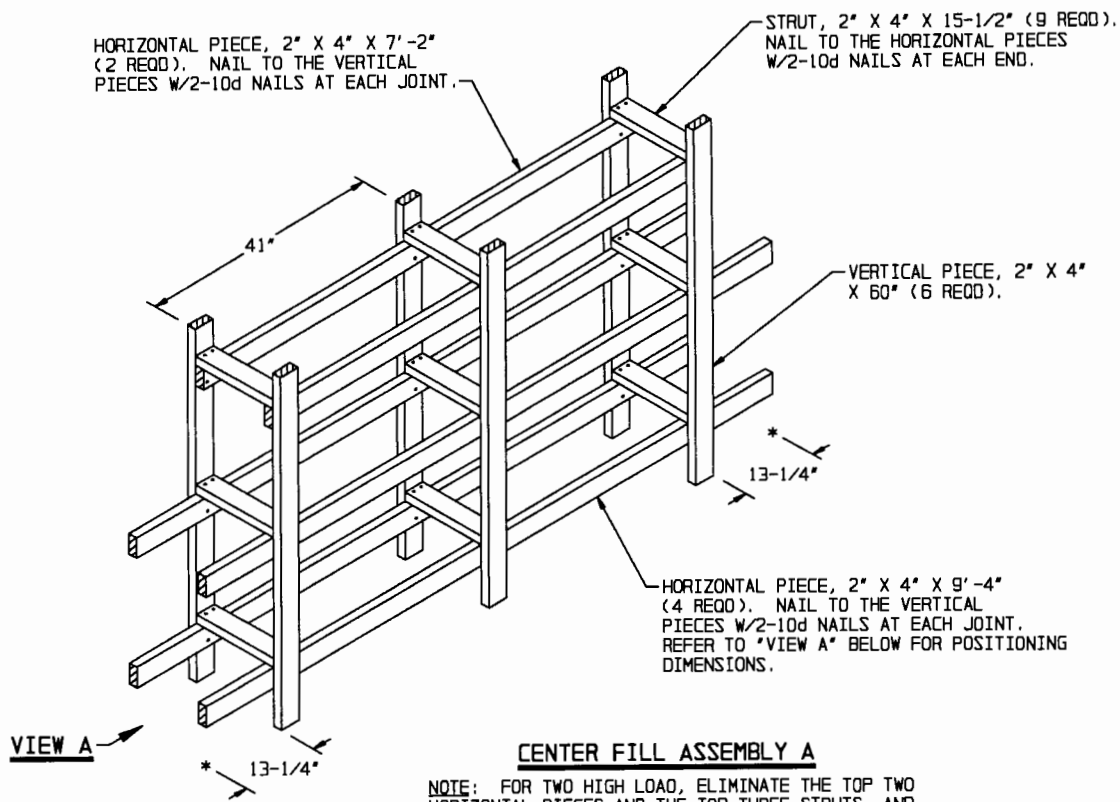
MK18 MOD 0 CRADLE

GROSS WEIGHT ----- 1,455 LBS (APPROX)
 CUBE ----- 59.3 CUBIC FEET (APPROX)

FILL MATERIAL, 1" X 4" OR
 2" X 4" MATERIAL BY CONTAINER
 WIDTH MINUS 1" (AS REQD).

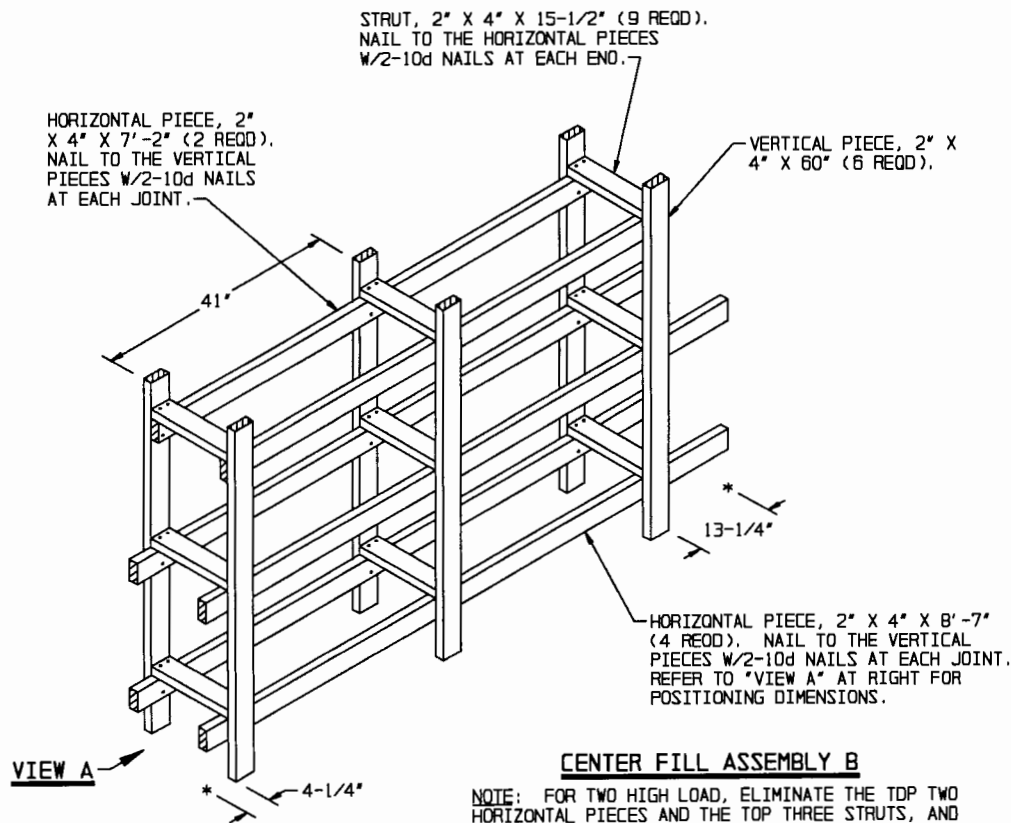


FILL DETAIL



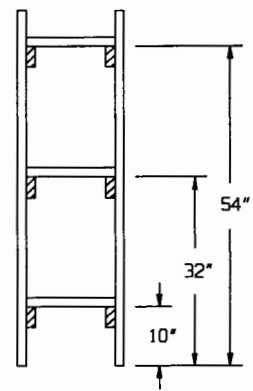
CENTER FILL ASSEMBLY A

NOTE: FOR TWO HIGH LOAD, ELIMINATE THE TOP TWO HORIZONTAL PIECES AND THE TOP THREE STRUTS, AND FOR A ONE HIGH LOAD, ELIMINATE THE TOP FOUR HORIZONTAL PIECES AND THE TOP SIX STRUTS. SHORTEN THE VERTICAL PIECES APPROPRIATELY.



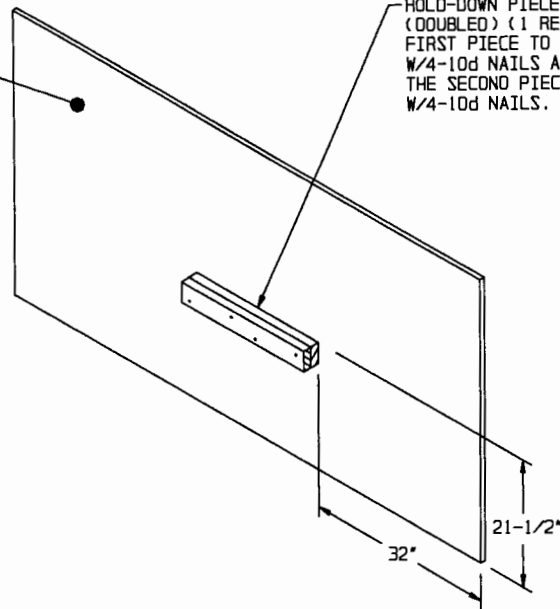
CENTER FILL ASSEMBLY B

NOTE: FOR TWO HIGH LOAD, ELIMINATE THE TOP TWO HORIZONTAL PIECES AND THE TOP THREE STRUTS, AND FOR A ONE HIGH LOAD, ELIMINATE THE TOP FOUR HORIZONTAL PIECES AND THE TOP SIX STRUTS. SHORTEN THE VERTICAL PIECES APPROPRIATELY.



PLYWOOD, 3/4" X 48" X 7'-7"
(1 REOD).

HOLD-DOWN PIECE, 2" X 4" X 24"
(DOUBLED) (1 REOD). NAIL THE
FIRST PIECE TO THE PLYWOOD
W/4-10d NAILS AND CLINCH. NAIL
THE SECOND PIECE TO THE FIRST
W/4-10d NAILS.

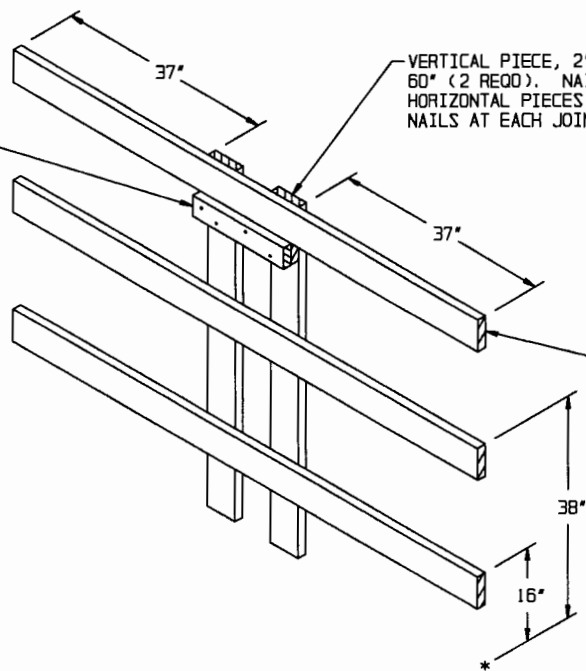


SEPARATOR GATE

HOLD-DOWN PIECE, 2" X 4" X 24"
(DOUBLED) (1 REOD). NAIL THE
FIRST PIECE TO THE VERTICAL
PIECES W/2-10d NAILS EACH. NAIL
THE SECOND PIECE TO THE FIRST
W/4-10d NAILS.

VERTICAL PIECE, 2" X 6" X
60" (2 REOD). NAIL TO THE
HORIZONTAL PIECES W/3-10d
NAILS AT EACH JOINT.

HORIZONTAL PIECE, 2" X 6"
BY INSIDE CONTAINER WIDTH
MINUS 1" (REF: 7'-7")
(3 REOD).



LOAD BEARING GATE A

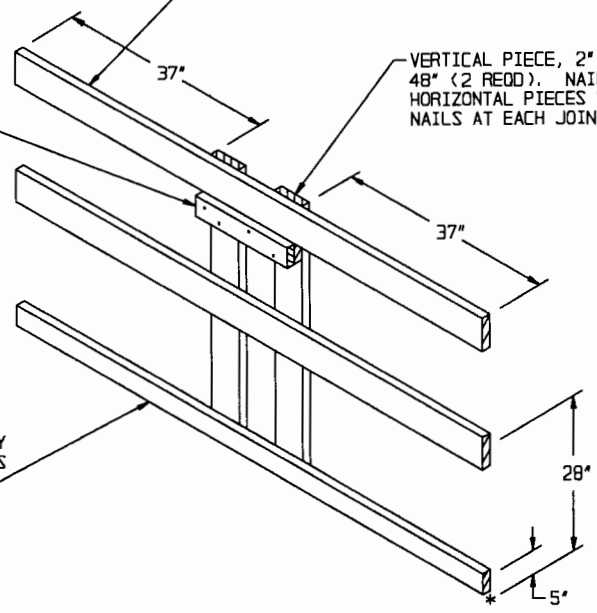
NOTE: FOR TWO HIGH LOAD, ELIMINATE THE TOP HORIZONTAL PIECE, AND FOR A ONE HIGH LOAD, ELIMINATE THE TOP TWO HORIZONTAL PIECES. SHORTEN THE VERTICAL PIECES AND LOWER THE HOLD-DOWN PIECES APPROPRIATELY.

HOLD-DOWN PIECE, 2" X 4" X 24"
(DOUBLED) (1 REOD). NAIL THE
FIRST PIECE TO THE VERTICAL
PIECES W/2-10d NAILS EACH. NAIL
THE SECOND PIECE TO THE FIRST
W/4-10d NAILS.

HORIZONTAL PIECE, 2" X 6"
BY INSIDE CONTAINER WIDTH
MINUS 1" (REF: 7'-7")
(2 REOD).

VERTICAL PIECE, 2" X 6" X
48" (2 REOD). NAIL TO THE
HORIZONTAL PIECES W/3-10d
NAILS AT EACH JOINT.

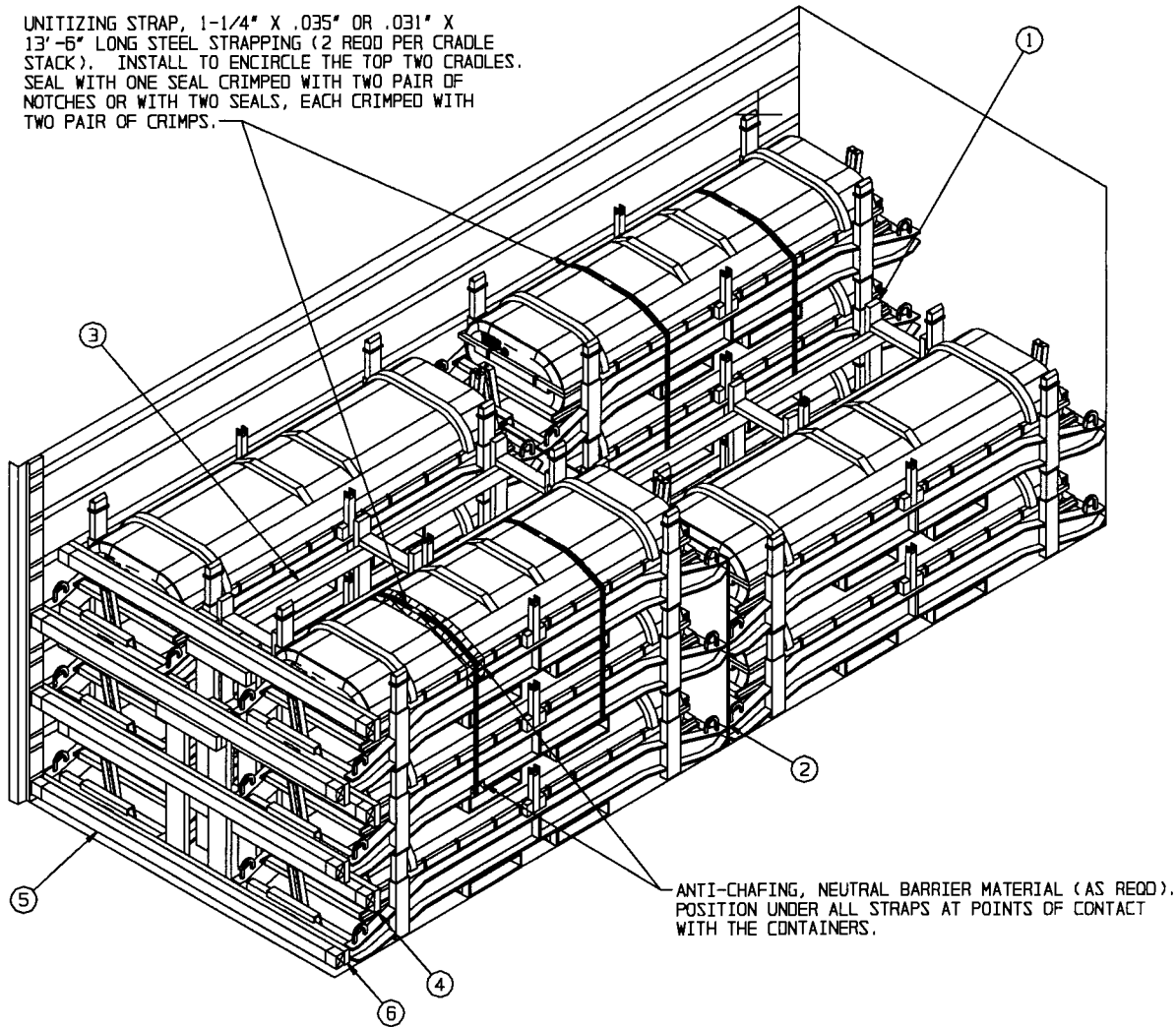
HORIZONTAL PIECE, 2" X 4" BY
INSIDE CONTAINER WIDTH MINUS
1" (REF: 7'-7") (1 REOD).



LOAD BEARING GATE B

NOTE: FOR TWO HIGH LOAD, ELIMINATE THE TOP HORIZONTAL PIECE, AND FOR A ONE HIGH LOAD, ELIMINATE THE TOP TWO HORIZONTAL PIECES. SHORTEN THE VERTICAL PIECES AND LOWER THE HOLD-DOWN PIECES APPROPRIATELY.

UNITIZING STRAP, 1-1/4" X .035" OR .031" X 13'-6" LONG STEEL STRAPPING (2 REOD PER CRADLE STACK). INSTALL TO ENCIRCLE THE TOP TWO CRADLES. SEAL WITH ONE SEAL CRIMPED WITH TWO PAIR OF NOTCHES OR WITH TWO SEALS, EACH CRIMPED WITH TWO PAIR OF CRIMPS.



ANTI-CHAFING, NEUTRAL BARRIER MATERIAL (AS REOD). POSITION UNDER ALL STRAPS AT POINTS OF CONTACT WITH THE CONTAINERS.

ISOMETRIC VIEW

SPECIAL NOTE:

WHEN REDUCING A LOAD BY ONE OR MORE CRADLES, IT WILL BE NECESSARY TO UNITIZE THE CRADLE STACKS WHICH ARE Laterally and Longitudinally Adjacent to the Omitted Cradle as Depicted in the Load View Above. See General Note "N" on Page 3.

LESS-THAN-FULL-LOAD PROCEDURE

KEY NUMBERS REFER TO KEY NUMBERS ON PAGE 2. NOTE THAT CENTER FILL ASSEMBLY A HAS BEEN MODIFIED AS DESCRIBED ON PAGE 5.